

R E P O R T R E S U M E S

ED 003 508

56

A FIELD EXPERIMENT IN THE SUMMERTIME USE OF OPEN-CIRCUIT TELEVISION INSTRUCTION TO BRIDGE THE GAP BETWEEN HIGH SCHOOL AND COLLEGE.

BY- HEAD, SYDNEY W. PHILIPS, C. LEE

MIAMI UNIV., CORAL GABLES, FLA.

REPORT NUMBER NDEA-VIIA-060

PUB DATE

61

EDRS PRICE MF-\$0.09 HC-\$1.72 43P.

DESCRIPTORS- #COLLEGE PREPARATION, EDUCATIONAL METHODS, EDUCATIONAL OBJECTIVES, #EDUCATIONAL PROGRAMS, #EDUCATIONAL TELEVISION, #OPEN CIRCUIT TELEVISION, STUDENT DEVELOPMENT, SUMMER PROGRAMS, PROGRAM EVALUATION, #POST HIGH SCHOOL GUIDANCE, CORAL GABLES, FLORIDA

A TWO-PHASE EXPERIMENT TESTED THE FEASIBILITY OF MOTIVATING RECENT HIGH SCHOOL GRADUATES TO DEVOTE SUMMER STUDY IN INTRODUCTORY COLLEGE STUDENTS FOR CREDIT BY MEANS OF OPEN CIRCUIT TELEVISION. A PILOT AND A EXPERIMENTAL COURSE WERE SCHEDULED IN SUCCESSIVE SUMMERS. THE PILOT PROGRAM SHOWED FAVORABLE RESULTS, BUT AN EXPANDED EXPERIMENTAL COURSE WAS USED FOR FINAL RESULTS. THE COURSES OFFERED WERE FRESHMAN ENGLISH, SYMBOLIC LOGIC, AND WORLD CIVILIZATION. COMPARATIVE PLACEMENT TESTS GIVEN AT THE BEGINNING OF THE SCHOOL YEAR SHOWED THAT THOSE WHO HAD COMPLETED THE TELEVISION COURSE WERE BETTER PREPARED FOR COLLEGE. THE MAIN QUESTION RAISED, HOWEVER, WAS ANSWERED IN THE NEGATIVE - IT WAS NOT POSSIBLE TO MOTIVATE A SIGNIFICANT NUMBER OF STUDENTS. STUDENTS WHO TOOK THE COURSE SHOWED HIGHER THAN AVERAGE MOTIVATION AND ACADEMIC ABILITY. EVIDENCE DID SHOW THAT THE SUMMER TELEVISION ASSISTED SOME STUDENTS IN MAKING THE TRANSITION TO COLLEGE AND STRONG EVIDENCE INDICATED THAT THE LEARNING EXPERIENCE ITSELF WAS EFFECTIVE. (PM)

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education

[This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated do not necessarily represent official Office of Education position or policy.]

A FIELD EXPERIMENT IN THE SUMMERTIME USE OF OPEN-
CIRCUIT TELEVISION INSTRUCTION TO BRIDGE THE GAP
BETWEEN HIGH SCHOOL AND COLLEGE

*

Chief Investigator

Sydney W. Head, Ph.D.
Director, Broadcasting & Film
Services, University of Miami

Tests & Measurements

C. Lee Philips, Ph.D.
Director, Testing Bureau
Guidance Center, University
of Miami

The research reported herein was supported by a grant from
the United States Office of Education, Department of Health
Education and Welfare

University of Miami
Coral Gables, Florida
1961

ED 003508

CONTENTS

	Page
I. SUMMARY	1
The Problem	1
The Method	1
The Results	1
II. PHASE I - THE PILOT PROGRAM	3
Description	3
Analysis of Data	4
Revision of Plans for Phase II	5
III. PHASE II - THE EXPERIMENTAL COURSES	7
Description	7
Experimental Design	8
Development of Test Instruments	10
Testing Procedures	15
Statistical Analyses	16
Results of Interviews After Residence	29
Student Attitude Toward Telecourses	31
Cost Analysis	34
IV. CONCLUSIONS	36
Sample Size	36
Sample Characteristics	37
Effectiveness of Television Teaching	38
Student Attitudes Toward Television Teaching	38
APPENDIX: PROJECT CONSULTANTS AND STAFF	39

I. SUMMARY

The Problem

This experiment was intended to test, under field conditions, whether it was feasible to motivate recent high school graduates to devote part of their summer to study of introductory college subjects for credit by means of open circuit television. It was hypothesized that such interim study might have several educational benefits: (1) accelerate the higher education of gifted students; (2) make up deficiencies of under-prepared students; (3) generally aid students in adjusting to the intellectual and self-disciplinary demands of college.

The Method

The experiment was divided into two phases, scheduled in successive summers. Phase I, 1959, consisted of a single pilot course intended to develop administrative procedures and to establish whether a sample of registrants of sufficient size could be obtained to justify the next phase. No statistical tests were applied to the registrants in this phase beyond what was necessary to evaluate performance for grading purposes. Phase II, 1960, expanded the offering to three courses, with measurements of a control group as well as the experimental group to isolate the learning increment presumed to be brought about by taking the TV courses.

The Results

Within the limitations of the conditions imposed (e.g., total student potential in the community, reach of the station, amount of publicity) the

main question raised by the experiment was answered in the negative. In other words, it proved not possible, under the conditions imposed, to motivate recent high school graduates to take interim courses by television in the summer in significantly high numbers.

With regard to the benefits hypothesized, it appeared that students with academic deficiencies were least likely to take such courses; the experimental population was distinctly characterized by higher-than-average motivation and academic ability. On the other hand, there was evidence to show that the courses did serve the function of assisting some students in making the transition from high school to college, and there was strong evidence to show that the learning experience itself was effective.

II. PHASE I - THE PILOT PROGRAM

Description

"English 111", then the usual entering Freshman required English course at the University of Miami, was chosen for the pilot program. Enrollment was limited to recent high school graduates who planned to enter the University of Miami in the fall. This limitation was imposed for two reasons: to keep registration procedure for the course as simple as possible, with credits being awarded retroactively after the student had formally entered the University in the fall; and to insure that the experimental population would be available for subsequent follow-up studies during residence at the University. Registration was accomplished by means of a simple informal application and awarding of credits was made subject to meeting all formal entrance requirements in the fall.

Information about the course was systematically distributed to high school seniors throughout Dade County, personal letters were sent to students already admitted to the University for the fall, promotional announcements were used on WTHS-TV (an educational station, licensed to the Dade County school system). News stories in the press received good display. In an attempt to supply added motivation, personal letters of explanation were sent to parents of students registered in the course.

English TV 111 was taught daily June 8-July 31, 1959, scheduled 7:30-8:00 PM. This amounted to 40 half-hour lectures. A five-hour final examination (the only required personal appearance on campus) was given August 3, three days after the last lecture. Sixteen grades were recorded for each student: those for eight weekly averages of daily written assign-

ments, four assigned homework themes, and four parts of the final examination. The final grade was based on an average of all these grades, except in the case of students who failed the departmental minimum-achievement test, failure in which mandated failure in the course, in accordance with departmental policy.

In order to maximize enrollment, no tuition was charged. Three required textbooks were made available as a package by the University bookstore for \$5.75. A ten-page mimeographed study guide was included without charge. Stamped envelopes were provided for submitting weekly written assignments.

The instructor, Dr. Robert Hively, Assistant Professor of English, lectured on English fundamentals three days a week and on literary topics the remaining two days. The instructor was provided with student assistants to handle grading of papers and to man telephones to answer questions concerning assignments and administrative details.

The University of Miami provided a producer-director, television production crew, and an artist. WTHS-TV was paid for the station time, including the salary of a supervisory engineer.

Analysis of Data

Of 219 students who originally registered for the English 111 tele-course, 102 completed the course and took the final examination. Of the 102 students receiving grades, 16% failed the course, a percentage of failure comparing favorably with experience with the same course taught on campus (Table 1).

Table 1

Comparison of grade distribution, TV course vs. Campus Course

Final Grade	<u>Television Students</u>		<u>Regular Students*</u>	
	Number	%	Number	%
A	11	10.8	23	2.8
B	30	29.4	144	17.6
C	36	35.3	380	46.6
D	9	8.8	154	18.9
E	<u>16</u>	<u>15.7</u>	<u>115</u>	<u>14.1</u>
Totals:	102	100.0	816	100.0

*All sections of English 111, first semester 1958-59.

The high attrition rate of the television group was apparently not due to dissatisfaction with the course. Seventy percent of the drop-outs occurred within the first two weeks. Subsequent follow-up interviews with 44 of the drop-outs who could be reached established that 70% gave conflict of other activities (mainly work schedules) as their reason for dropping the course; 25% gave a change in educational plans as their reason.

Student attitudes toward the television courses were assessed by means of a brief, pre-coded questionnaire administered at the final examination time, and an assignment to write a critical evaluation of the course. Attitudes were favorable. Only 6% said they would not advise a friend to take the telecourse next summer, while 47% said they would advise a friend to take more than one course if available.

Revision of Plans for Phase II

Results of the pilot course indicated generally the feasibility of the experiment, but raised a question as to whether a sample of adequate size

for several courses could be obtained. The small registration in the pilot course was ascribed to several causes: (1) WTHS-TV at the time had low power and a relatively limited coverage area; (2) the contract had been awarded so late that little time had been available for publicity efforts; (3) limitation of admission to students planning to enter the University of Miami eliminated the large number of students planning to go elsewhere to school from the potential enrollment and also made it difficult to secure cooperation from counsellors in the high schools.

The first two of these problems were automatically eliminated in 1960: WTHS-TV installed a higher antenna and increased its power enabling full coverage of Dade and adjacent counties; and there was ample time to plan and carry out a publicity campaign. In order to remove the ceiling imposed by the third limitation, it was decided to open the courses to any recent high school graduate, irrespective of college plans. This change, however, complicated the registration procedure considerably, since it necessitated *formal matriculation procedures* prior to taking the television courses in place of the retroactive awarding of credits. Formal admission was essential so that students planning to transfer their summer credits elsewhere would have a transcript.

III. PHASE II - THE EXPERIMENTAL COURSES

Description

In accordance with the findings of the pilot program, it was decided to admit to the summer telecourses in 1960 any recent high school graduate who had not had previous college work. Applicants were required to go through the usual formalities of matriculation before the start of the courses; these included taking the battery of college placement tests, which are normally given in advance to local applicants during March, April, May, and June.

The publicity devices used in the previous summer's program were used again, with the addition of a speaker who was made available to address high school student groups wherever it was feasible to make arrangements for a personal appearance. The speaker went as far afield as West Palm Beach, about 60 miles north. The device of letters to parents as an added motivator was abandoned as its effect in 1959 had not been measurable.

It was decided to offer three telecourses in the summer of 1960 scheduled from June 13 through August 5 as follows:

Freshman English (Dr. Robert Hively)	M-F 7:00-7:35 PM
Symbolic Logic (Dr. Edward Schuh)	M-F 7:40-8:15 PM
World Civilization (Dr. William Munson)	M-F 8:25-9:00 PM

It was planned to have as many 30-minute telelectures in each course as there would normally be 50-minute lectures in the on-campus equivalent course. Since the station was not available for the requisite number of weeks, the same time ratio was maintained by lengthening the telelectures to 35 minutes each. The short breaks between programs were scheduled for

the convenience of students who might be taking two or more adjacent courses.

Content of these courses was identical with that of the comparable courses as taught on campus. The main difference in method, aside from the fact of television, was that more written homework and fewer examinations were required of the television students. This was necessitated by the fact that the students appeared on campus personally only once during the courses, on the occasion of the final examinations. The instructors exploited the visual possibilities of television as fully as possible and attempted to adapt their teaching styles to the situation of students viewing singly or in very small groups.

TV students mailed in their homework at their own expense weekly and received corrected papers back by mail, so that they had indication of progress and standing as the courses developed. Assistants on campus manned telephones at announced hours to answer questions about assignments or give help in carrying them out.

Except in the respects noted, the procedures in 1960 generally followed those developed in the pilot program in 1959.

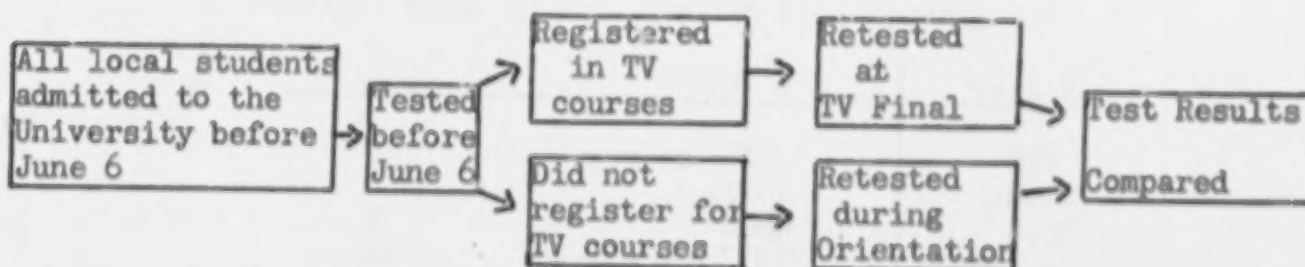
Experimental Design

Numerous studies and experiments have already established the effectiveness of television as a medium of instruction. Although this was an underlying assumption of the present study, it was necessary for purposes of the study to make a careful analysis of the experimental population, to test the relative effectiveness of on-campus compared to television teaching under the particular conditions and in the particular subjects involved, and to employ adequate controls to enable isolation of the learning ascribed to

television from learning that might occur as a result of other influences.

Toward these ends, two forms of suitable tests in each of the subjects to be taught were prepared and standardized in advance (for details see "Development of Tests" below). Form "A" of each of these special subject-matter tests was added to the regular battery of college placement tests during the early testing periods for local students scheduled prior to the start of the telecourses. Form "B" of these tests was used as part of the final examination in the telecourses, and was also given during Orientation Week, just prior to the start of classes in the fall semester, to a group of non-television students who had already taken Form "A" of the tests in the spring placement test program.

Thus two groups of students were identified, those who had taken the TV courses and those who had not, each group having two test scores for each TV subject, one obtained before the courses were offered and one obtained after the courses had been completed. Comparisons of the "before" and "after" scores indicated the effectiveness of the courses. The design is summarized schematically as follows:



Since both TV- and non-TV students had also taken the regular admissions test battery it was possible also to equate the experimental and control groups statistically on the basis of other tests.

Development of Tests

English

For English 111 (the on-campus course equivalent to the English tele-course) the English Department had available 1400 answer sheets for three 100-item tests. For each item, phi coefficients and an index of difficulty were computed on the basis of the existing answer sheets. The items were then divided into the three categories of Spelling, Grammar, and Effectiveness. In each category, items were listed in order of difficulty. Those items whose phi coefficients were considered unsatisfactory were eliminated. Trial examinations were thus built providing a range from easy to difficult items in each category. A committee of the English Department then sifted the selected items from the standpoint of content. Finally two 75-item tests of approximately equal validity, difficulty, and content were evolved, identified as English Test "A" and English Test "B". No further experimentation was possible at this time.

However, in May, 1960, both of these tests were administered to 288 students registered in on-campus sections of English 111. Test "A" was taken first by 148 of the group, test "B" first by 140 of the group. Table 2 summarizes the results.

Table 2

Test Results
Prefinal Examination, English 111, Spring, 1960

	Test A	Test B
N	288	288
M ^a	41.87	40.00
σ	8.05	8.05
σ_M	.47	.47
F		.76
D		1.87
σ_D		.33
t		5.69

a - These are raw scores

The obtained coefficient of reliability of .76 was judged to indicate that the tests had sufficient reliability for purposes of the study. The slight but highly significant mean difference indicated that raw scores on both should be converted to standard scores before comparison between the groups could be made.

For the purpose of computing standard scores, the test results of the entire early-tested population, given Form "A", and the orientation-week population, given Form "B", were used. These groups were the most heterogeneous of the groups to whom the tests were administered. Table 3 summarizes the data used to produce the standard score conversion tables for the two English tests.

Table 3

Data for English Standard Score Conversion Tables

	<u>English Test A</u>	<u>English Test B</u>
Date	March to June 1960	Sept. 12-13, 1960
N	822	572
M	43.02	41.39
σ	10.86	10.13

History

The History Department also had already developed a common pool of test items from which each instructor draws in making up his own final examination. For purposes of the experiment, the TV instructor enlisted the aid of two colleagues in drawing from this pool a special final examination for their on-campus classes in the fall semester of 1959-1960. Each agreed to build his own 100-item examination with as little item duplication as possible.

Table 4 summarizes the results of these three final examinations for the fall semester.

Table 4

History 101 - Fall Semester, 1959-1960
Comparison of Three Final Examinations

	Test M	Test C	Test H
N	224	224	155
M	67.72	59.23	58.34
σ	13.98	14.61	12.60

For each item of each of these three tests phi coefficients and an index of difficulty were computed. From the total pool of 300 items two 50-item tests of approximately equal validity and difficulty were then constructed. Again time prevented a tryout before the experimental testing began.

However, the History Department cooperated by using both Form A and Form B as the final examination in on-campus sections of History 101 in the spring semester of 1960. Each student took both forms, half taking Form A first and half taking Form B first. The results are summarized in Table 5.

Table 5

Test Results
Final Examination, History 101, Spring, 1960

	Test A	Test B
N	526	526
M ^a	30.41	29.44
σ	7.71	7.40
σ/M	.33	.32
r		.82
D		.97
σ/D		.20
t		4.85

a - These are raw scores.

The obtained coefficient of reliability of .82 was judged to indicate that the tests were sufficiently reliable for purposes of the study. The obtained mean difference, while statistically significant, was too small to have any practical meaning. It was felt, however, that raw scores on the History tests should also be converted to standard scores, if for no other reason than to make the statistics from all the tests used in the experiment comparable. The same scaling procedure was used as in the English tests (see p. 11). Table 6 summarizes the data used to produce the standard score conversion tables for the two History tests.

Table 6

Data for History Standard Score Conversion Table

	<u>History Test A</u>	<u>History Test B</u>
Date	March to June 1960	September 1960
N	821	572
M	18.28	19.37
σ	5.18	5.53

Logic

In the case of the Logic course no ready-made pool of test items was available, so that it was necessary for the television instructor to construct special tests de novo. He made up two 60-item tests, attempting to devise some items easy enough to be answered by persons without formal training in logic and to insure that each test would cover the content of the course as he proposed to teach it. These examinations were administered as a pretest to on-campus classes in the subject during the first week of the second semester, 1959-1960. The results are reported in Table 7.

Table 7

Pretest, Philosophy 103, Logic, Spring, 1960

	<u>Test A</u>	<u>Test B</u>
N	106	134
M	32.47	25.87
σ	5.54	5.70

For each item on each test phi coefficients and an index of difficulty were computed. Then two 50-item tests were constructed from the pool of 120 items. Since it was realized that the experimental population was naive as far as formal symbolic logic was concerned, the tests were skewed toward the more difficult end of the spectrum. No further experimentation with the Logic tests was possible beyond this brief and somewhat inadequate tryout.

In May, however, it was possible to administer the two Logic tests as part of the final examination in three on-campus sections in Logic (Philosophy 103). One section took both Test "A" and Test "B", one section took Test "A" only, and one section took Test "B" only. Table 8 summarizes the results.

Table 8

Test Results
Final Examination, Philosophy 103, Logic, Spring, 1960

	<u>Test A</u>	<u>Test B</u>
N	96	82
M ^a	29.39	33.62
σ	5.10	5.05
σ_M	.52	.56
D		4.23
σ_D		.76
t		5.57

a - These are raw scores.

Form B proved significantly easier than Form A. An estimation of the reliability of each form by the Spearman Brown formula gave Form A an r of .78 and Form B an r of .60. While these are relatively low, it was felt they were sufficiently high to permit the tests to be used in the experiment.

It was evident that the raw scores would have to be converted to standard scores before it would be possible to make comparisons between results obtained from the two tests. Table 9 summarizes the data used in scaling.

Table 9

Data for Logic Standard Score Conversion Tables

	<u>Logic Test A</u>	<u>Logic Test B</u>
Date	March to June 1960	September 1960
N	822	572
M	22.51	25.55
σ	5.76	5.98

Testing Procedures

The A forms of the three subject-matter tests hitherto described were administered to all testees during regular early placement testing periods on March 25, April 2, May 7, and June 4, 1960. No announcement was made concerning the nature of these additional tests. In the one or two instances where an inquiry was made, students were simply told that they were examinations that the University was requiring this year.

Final examinations were given on campus within a few days of the close of the telecourses, early in August, 1960. Each of the final examinations included the "B" form of the subject matter examinations as well as other

material prepared by the course instructors.

In September, 1960, when all Freshmen were available during Orientation Week, the group of over 500 students who had taken the Placement Tests between March 25 and September 2 was required to take Form B of the tests. The students were told that the testing was for research purposes, but the specific purpose was not revealed. Proctors reported that student motivation appeared to be satisfactory during this test period.

Statistical Analyses

Experimental and Control Populations

Sixty-six students comprised the experimental population. Almost twice as many had originally applied for one or more of the telecourses; however, this high attrition rate was not unexpected on the basis of the experience in the pilot program in 1959 (see p. 4 above). Tables 10 through 13 summarize data on enrollment.

Table 10

Attrition of Sample, By Students

<u>Action</u>	<u>Students</u>	
	<u>No.</u>	<u>%</u>
Applied	123	100
Registered	86	70
Dropped	20	16
Completed	66	54

Table 11

Attrition of Sample, By Course

<u>Action</u>	<u>English</u>	<u>Logic</u>	<u>History</u>	<u>Total Reg-istrations</u>
Registered	79	68	70	217
Dropped	22	19	22	63
Completed	57	49	48	154
Deleted*	2	2	1	5
In study	55	47	47	149

*Records incomplete for purposes of study.

Table 12

Course Combinations, By Number of Courses Taken

	Number of Courses		
	<u>3</u>	<u>2</u>	<u>1</u>
Number of students completing	31	21	14

Table 13

Course Combinations, by Subject Matter

<u>Combinations</u>	<u>Number of Students Completing</u>
Eng., Logic, Hist.	31
Eng., Hist.	6
Eng., Logic	7
Logic, Hist.	8
Eng. only	11
Logic only	1
Hist. only	<u>2</u>
Total:	66

The control population consisted of 362 students who had taken both Form A and Form B of the subject matter tests without having taken the telecourses in the interval between tests.

Comparisons Based on Placement Test Scores

Studies at the University of Miami of the relation between placement tests scores and academic achievement (as indicated by grade point average) have shown that the Total Score of the Cooperative English Examination is the best single predictor in the battery of placement tests. This score, as well as the better-known Total Score from the American Council of Education, Psychological Examination (hereafter referred to as "ACE"), was used as the basis for comparisons between the experimental and control populations.

Table 14 shows the significance of the difference between the mean Total English scores and the mean Total ACE scores for the control and experimental groups.

Table 14
Placement Test Results
Control Group vs. Total Experimental Group

	Total Coop. English Score Control	Experimental	Total ACE Score Control	Experimental
N	362	66	362	66
M	56.29	59.17	113.26	120.42
Percentile equiv. of mean	46%le	58%le	59%le	70%le
σ	8.14	7.85	22.11	24.86
σ_M	.43	.97	1.16	3.06
F^A		1.07		1.26
D		2.88		7.16
σD		1.06		3.27
t		2.73**		2.19*

A - For all t tests shown in this report, the underlying assumption of homogeneity of variance has been fulfilled.

* - On this and all subsequent tables, t's marked * are significant at the 5% level of confidence.

** - t's marked ** are significant at the 1% level of confidence.

This table shows that the experimental group has more college ability as measured by the ACE, and has a better background in English as measured by the Total Score on the Cooperative English Examination.

Table 14 compares the 66 individual students who completed the television courses to the control group. As a further refinement, Tables 15, 16, and 17 compare the students as they are divided into each of the three television courses with the control group.

Table 15

Placement Test Results
Control Group vs. TV English Group

	Total Coop. English Score		Total ACE Score	
	Control	Experimental	Control	Experimental
N	362	55	362	55
M	56.29	58.47	113.26	118.29
Std equiv. of mean	46%le	54%le	59%le	67%le
s	8.14	8.07	22.11	24.89
SD	.43	1.09	1.16	3.36
F		1.02		1.00
D		2.18		5.03
t		1.17		3.55
		1.87		1.41

Data presented in Table 15 indicates that the students who elected to take TV English do not differ significantly from the control group either in their college ability as measured by the ACE or in their knowledge of English as measured by the Total Score of the Cooperative English Examination.

Table 16

Placement Test Results
Control Group vs. TV History Group

	Total Coop. English Score		Total ACE Score	
	Control	History	Control	History
N	362	47	362	47
M	56.29	60.43	113.26	123.13
Std equiv. of mean	46%le	62%le	59%le	74%le
s	8.14	8.17	22.11	25.45
SD	.43	1.19	1.16	3.71
F		1.00		1.05
D		4.14		9.87
t		1.27		3.89
		3.27**		2.54*

It appears from the data presented in Table 16, however, that the

students who elected to take TV History have more college ability as measured by the ACE and possess a greater knowledge of English as measured by the Cooperative English Test than the control group. It is probable that these differences did not occur by chance.

Table 17
Placement Test Results
Control Group vs. TV Logic Group

	Total Coop. English Score Control	Logic	Total ACE Score Control	Logic
N	362	47	362	47
M	56.29	61.19	113.26	126.72
%le equiv. of mean	46%le	66%le	59%le	78%le
σ	8.14	6.94	22.11	21.77
σ M	.43	1.01	1.16	3.18
F		1.38		1.30
D		4.90		13.46
Δ D		1.10		3.38
t		4.46**		3.98**

Table 17 shows that those students who elected to take TV Logic differ significantly from the control group in both the amount of college ability they possess, as measured by their score in the ACE, and in their knowledge of English as measured by the Cooperative English Test.

From the data presented in Tables 14 through 17 it would be expected that the experimental group would show greater score increases from Form A to Form B than the control group even if they had not taken the courses.

Comparison of TV English with On-Campus English

Table 18 compares the distribution of grades in TV English to the distribution of grades in the comparable on-campus course, English 111, for the spring semester 1960.

Table 18

Grade Distributions
TV English vs. English 111, Spring, 1960

Grade	TV English		English 111	
	N	Percent	N	Percent
A	10	18	61	7
B	15	27	216	26
C	27	49	417	49
D	2	4	116	14
E	<u>1</u>	2	<u>35</u>	4
Total:	55		845	

The skewing of the TV grade distribution toward the upper end of the scale may be explained by the data in Table 19. Students enrolled in Freshman composition are normally assigned to courses at several levels on the basis of the scores they earn on the Placement Tests. For purposes of assignment by level the Mechanics of Expression score of the Cooperative English Test is added to the Effectiveness of Expression score from the Cooperative English Test. Table 19 compares the grades earned in TV English with the composition course in which the student would have been enrolled during a regular semester. The courses are numbered in ascending order of difficulty, with English 100 representing a remedial (sub-Freshman) level.

Table 19

TV English
Course Grade by Mechanics plus Effectiveness Scores
and Normal English Course Assignment

Scores		Normal Eng. Course Assignment	Course Grades					Total
			A	B	C	D	E	
160	164	113						
155	159	113						
150	154	113						
145	149	113	1	1				2
140	144	113	1		1			2
135	139	113						
130	134	113	2					2
125	129	113	2	5	3			10
120	124	112	2	3	1		1	7
115	119	112	2	1	4			7
110	114	111		3	4			7
105	109	111		2	2			4
100	104	111			1	1		2
95	99	100			7			7
90	94	100			2			2
85	89	100						
80	84	100			1	1		2
75	79	100						
70	74	100			1			1
65	69	100						
Total:			10	15	27	2	1	55

Table 19 shows that 30 students, or 55%, of the TV English group would have been assigned to more advanced on-campus English courses, namely English 112 or 113. This group accounted for all of the "A's", 67 percent of the "B's", 33 percent of the "C's", none of the "D's", and the only "E" recorded. Twelve of the students, or 22 percent of the group, would not have been permitted to enroll in English 111 but would have been required to take the remedial course, English 100. Yet all of these students

earned "C" grades in the TV course except one, whose grade was "D". This finding is similar to the results obtained in the pilot course in 1959.

Comparison of TV Logic with On-Campus Logic

Table 20 compares the grade distribution in TV Logic with the grade distribution of the comparable on-campus course, Philosophy 103, for the Spring Semester, 1960.

Table 20

Grade Distributions

TV Logic vs. Philosophy 103, Spring 1960

Grades	TV Logic		Philosophy 103	
	N	Percent	N	Percent
A	13	28	44	13
B	13	28	66	20
C	16	34	102	31
D	2	4	65	20
E	3	6	53	16
Total:	47		330	

It can be seen from this table that the TV grades are definitely skewed toward the high end of the scale. Since there are no placement test prerequisites for Philosophy, it is not possible to make the type of comparison with standardized tests that was made for English. However, Table 17 shows that the students who enrolled in the TV Logic course were well above the average for entering college Freshmen in both college ability and in their knowledge of English. Subjectively, the TV instructor reported that the final examinations for this group were the best he had read in

ten years of teaching college logic.

Comparison of TV History with On-Campus History

Table 21 compares the grade distribution of TV History with the grade distributions of History 101, the comparable on-campus course, for the Spring Semester, 1960.

Table 21

Grade Distributions
TV History vs. History 101, Spring, 1960

Grades	TV History		History 101	
	N	Percent	N	Percent
A	5	11	37	7
B	19	40	133	25
C	13	28	192	36
D	7	15	122	23
E	3	6	50	9
Total	47		534	

Again the score distribution is skewed toward the top but reference to Table 16 shows that, as with TV Logic, students taking the TV History course were above average for entering College Freshmen in college ability and knowledge of English.

Comparison of TV Test Scores, Experimental vs. Control Groups

Table 22 shows that for the control group the mean decreased .83 of a standard score between the spring and fall testings, whereas students who took the TV English course showed a gain of 5.82 standard scores between the two testings.

Table 22

Difference Between the Means Control and TV English Groups
English Test A vs. English Test B

		Test A	Test B
	N	362	362
Control	M	50.34	50.07
	σ	9.69	9.73
	σ/M	.26	
	F		1.01
	r		.83
TV English	D		.27
	σD		.30
	t		.90
	N	55	55
	M	52.51	58.33
TV English	σ	7.97	9.02
	σ/M	1.07	1.22
	F		1.28
	r		.82
	D		5.82
	σD		.70
	t		8.31**

Table 23 shows that between the Spring and Fall Testing the control group lost .49 of a standard score. The TV Logic group, on the other hand, gained 17.23 standard scores.

Table 23

Difference Between the Means Control and TV Logic Groups
Logic Test A vs. Logic Test B

		Test A	Test B
Control	N	362	362
	M	50.79	50.01
	σ	9.35	9.95
	σM	.49	.52
	F		1.13
	R		.49
	D		.78
	σD		.51
	t		1.53
TV Logic	N	47	47
	M	51.72	68.96
	σ	11.58	10.41
	σM	1.69	1.52
	F		1.23
	r		.31
	D		17.23
	σD		1.89
	t		9.12**

Table 24 shows that the control group gained .88 of a standard score between the Spring and Fall Testing. The TV History group, however, increased its mean score by 24.74 standard scores.

Table 24

Difference Between the Means Control and TV History Groups
History Test A vs. History Test B

		Test A	Test B
Control	N	362	362
	M	49.27	50.15
	$\bar{d}$	10.92	9.99
	$\bar{d}_M$	.57	.53
	F		1.19
TV History	r		.58
	D		.88
	$\bar{d}_D$		.51
	t		1.73
	N	47	47
TV History	M	54.04	78.79
	$\bar{d}$	12.30	11.42
	$\bar{d}_M$	1.79	1.67
	F		1.16
	r		.56
	D		24.74
	$\bar{d}_D$		1.62
	t		15.27**

Tables 22, 23, and 24 show that for the control group the differences between the mean scores on Test "A" and Test "B" are always less than one standard score. But for the experimental groups, the mean differences were always appreciable and highly significant.

Analysis of Covariance

We have already shown in Table 14 that the experimental group, as a whole, was better than the control group both in terms of college ability and knowledge of English. Tables 22 through 24 also show, although direct comparisons were not made, that the experimental groups scored higher on Form "A" of the TV tests. It is possible, therefore, that the highly significant t tests, reported in Tables 22 through 24, are merely a reflection

of the original inequality of the two samples.

To investigate this possibility analyses of covariance were performed to test the significance of the difference between means while holding constant the effect on those means of common factors. Analyses of covariance were made between the mean Test "B" scores of the control group and each of the TV class groups, holding constant the effect of Test "A" and ACE scores for each of the groups. Tables 25, 26, and 27 report the results of these analyses.

Table 25

Comparison of Control and TV English Groups
through Analysis of Covariance

<u>Source</u>	<u>Sums of Squares</u>	<u>d.f.</u>	<u>Mean Squares</u>	<u>F</u>
Between	2,076.69	1	2,076.69	
Within	<u>11,586.97</u>	<u>413</u>	28.06	74.01**
Total	13,663.66	414		

Table 26

Comparison of Control and TV Logic Groups
through Analysis of Covariance

<u>Source</u>	<u>Sums of Squares</u>	<u>d.f.</u>	<u>Mean Squares</u>	<u>F</u>
Between	10,123.61	1	10,123.61	
Within	<u>25,893.33</u>	<u>413</u>	62.70	161.46**
Total	36,016.94	414		

Table 27

Comparison of Control and TV History Groups
through Analysis of Covariance

<u>Source</u>	<u>Sums of Squares</u>	<u>d.f.</u>	<u>Mean Squares</u>	<u>F</u>
Between	29,699.80	1	29,699.80	
Within	<u>25,399.34</u>	<u>413</u>	61.50	482.92**
Total	55,099.14	414		

Results of the analyses of covariance as reported in Tables 25 through 27 indicate that, even after due correction is made for the disparity in college ability and pretest scores, the groups that participated in the TV courses show score gains that cannot be attributed to chance.

Statistical Conclusions

Analysis of the data presented in this section of the report appears to substantiate the following conclusions:

1. This experiment has shown that when given the opportunity to take summer courses in basic college subjects, the more able high school graduates will do so with greater frequency than those of lesser ability.

2. It is possible to teach successfully English, Logic, and World History courses by means of open circuit television when the criterion of success is the increase in scores on tests of those subjects especially prepared for this purpose.

Results of Interviews After Residence

Thirty-eight percent of the experimental population was registered at the University of Miami for the second semester following the 1960 summer TV courses. Depth interviews were conducted with these students, who had

by then completed a full semester's college work in residence. These students had been exposed mostly to large-class teaching situations in their on-campus experience.

Interviewees were unanimous in an enthusiastically favorable attitude toward the television instruction in the perspective of their semester's residence as full time students. They made such statements as "the most beneficial course I ever took", "most worthwhile thing I've ever done", "never had to study like that before".

They indicated that, given a choice between identical summer courses taught on campus and on TV, they would choose TV. This preference was based in part on convenience, but there seemed also to be a strong feeling that TV instruction offered them real educational advantages over large-class on-campus instruction. Students mentioned being able to see and hear better on TV, of being able to "get more out of" TV. On the other side of the argument, they mentioned being inhibited or distracted by the rigidity and formality of the large classroom.

On the point of the effectiveness of the summer TV as a transitional device between high school and college, opinion divided along intelligence lines. The brightest students seemed not to need any transitional cushion; indeed, several mentioned having studied harder in accelerated high school courses than in their on-campus Freshman college courses. The less gifted, however, seemed to receive positive benefits from the TV experience as an introduction to college work. They mentioned finding out about their own deficiencies in study habits, learning to pace themselves, being prepared for the amount of reading expected of them, and benefiting from the well-organized syllabi of the TV courses. Even students who received "D" grades

had favorable attitudes toward TV, blaming low grades on their own lack of application rather than on the teaching method.

Although several students mentioned missing the opportunity for personal contact with teachers, none believed that this disadvantage had any effect on learning. Student-teacher contact seemed to be regarded as personally desirable but not essential to the educational objectives of the courses. on the whole, the device of having student assistants available for answering questions by telephone seemed to be satisfactory as a functional substitute for teacher-student personal contact, although a few complaints were made about inadequacies of some of the student assistants.

Probes were used to draw out the interviewees on possible reasons for the low enrollment in the TV courses. Publicity seems to have been adequate, but the point was made that high school seniors are bombarded with such quantities of information about college and vocational opportunities that it is easy for any given item to be lost in the shuffle. It seemed to require personal influence from a teacher or a friend to bring a given piece of information into focus.

Group watching was reported frequently, usually involving parents or other relatives and sometimes including neighbors. Group watching was not considered distracting by most respondents, nor did students have difficulty with competition for access to the TV set with other members of the family.

Student Attitudes Toward Telecourses

Attitudes toward the telecourses were evaluated in two ways: (1) as reported above all television students who were in attendance at the University of Miami at the beginning of the second regular semester

following the telecourses were interviewed concerning their attitudes in retrospect; (2) students were asked to fill out a pre-coded questionnaire as part of their final examination in each course.

Results of the interviews indicated a high degree of acceptance on the part of the students who subsequently attended the University of Miami. Results of the questionnaire are summarized in Table 28. In general, relatively few students reported having difficulties with the TV courses. The most frequent complaints had to do with the amount of homework and lack of information on grade-status. The instructors were rated as better than "fair" in 92 percent of the responses. With regard to the scheduling of the courses, the only complaints frequently made were against the five-day-a-week scheduling of classes and the shortness of the class period.

Table 28

Results of Evaluation Questionnaire

Difficulties	English (N=59)	Logic (N=48)	History (N=58)	Total (N=155)
Lectures hard to follow sometimes	7%	25%	10%	13%
Assignments not always clear	24	6	10	14
Needed personal help from instructor	7	33	10	16
Went too fast, not enough time to get everything	10	10	21	13
Some of the material too difficult		8	2	3
Hard to concentrate, too many distractions when viewing	14	6	17	12
TV reception not good	10	10	6	9
Got bored, hard to pay attention to lectures	12	8	12	11
Too much homework	36	4	48	30
Not enough info. on where I stood as to grades	20	19	37	25
Had none of the above difficulties to any serious extent	42	48	35	42
<u>Instructor</u>				
Very good	85%	62%	83%	77%
Pretty good	13	23	15	17
Fair	2	10	2	5
Not so good	-	2	-	0.5
Very poor	-	-	-	-
No comment	-	2	-	0.5
<u>Class time</u>				
All right on the whole	78%	81%	75%	78%
Conflicted with other programs desired by members of the family	5	4	5	5
Too early in the evening	7	-	2	3
Too late in the evening	5	4	6	5
Too frequent - would prefer fewer lessons a week, more weeks	15	10	21	15
Would prefer longer lessons - 45 min. or an hour	22	17	25	21

Cost Analysis

The costs shown in Table 29 do not include the expense of the experimental features of the project. Project administrative expense is calculated as 40 percent of salaries.

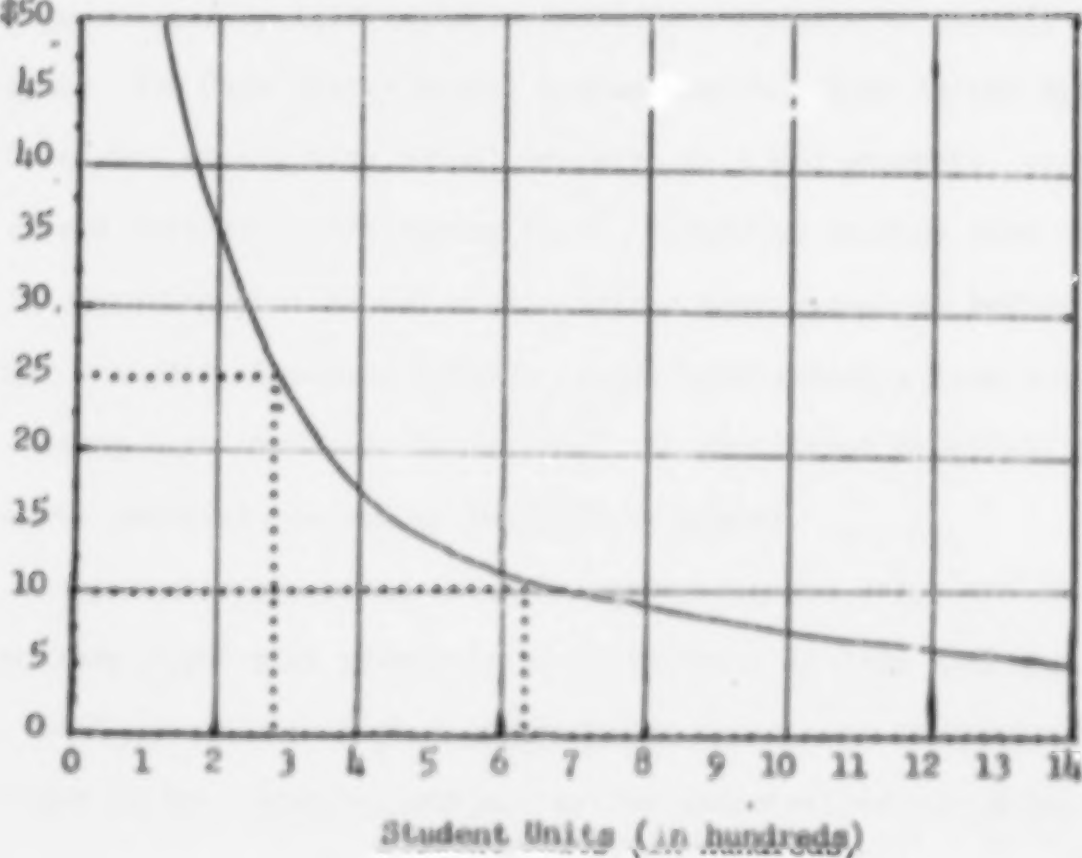
Table 29

Breakdown of Costs for Three Telecourses (9 credits)

Administrative expenses	\$4,484
Teachers' salaries	4,920
Graders	2,920
Clerical & misc	111
Production crew	3,193
Teaching materials, etc.	64
Transportation	300
Station time	4,063
F.I.C.A.	337
Total:	\$20,372
Average cost per credit	\$ 2,264

In calculating the number of registrations needed to reach a break-even point in costs it has been arbitrarily assumed that general institutional overhead (as distinguished from project overhead mentioned above) should be estimated at twice direct teaching costs. In other words, the cost-per-credit reported in Table 29 has been tripled in Graph I, which reports the break-even point in terms of "student-units", a student-unit being defined as one student registered for one credit. Thus one student taking three three-credit courses accounts for nine student units; three students each registered for one three-credit course also account for nine student units. According to Graph I, as an example, if the tuition fee is \$25 per credit, 272 student-units would be required to break even. If the average enrollment per student were six credits, this would mean needing a total of 45 students (= 270 student units) to break even.

Tuition
Fee Per
Credit
\$50



GRAPH I

Break-even Point by Tuition Rates

IV. CONCLUSIONS

Sample Size

The basic question asked by this experiment was: could high school seniors be motivated to give up part of their summer vacation to take credit college courses by television in sufficient numbers to justify such a teaching program? The Dade County school system reported that in the spring of 1960 56.6 percent of all high school seniors, or 3,680 students, were planning to attend college the following fall. Follow-up studies were not completed at this writing, but school statisticians have reason to believe that the number actually attending college is not substantially less than the number expressing that intention in advance. An additional potential exists in adjacent counties reached by the WTHS-TV signal.

Conservatively, using the Dade County figures only, the sample obtained from these 3,000-plus prospects of 66 students is less than 2 percent of the total potential. Such a low response would seem to answer the basic question in the negative, subject to the uncontrolled variables of the experiment. Prominent among these is the factor of promotion. The evidence is that the publicity for the summer courses was reasonably successful in reaching the target audience, but it is conceivable that a more vigorous information campaign with cumulative year-to-year effect might increase the percentage of registrants over a period of time; nevertheless, it seems doubtful that a really substantial proportion of the potential population could be persuaded to take summer TV courses. It appears that the conflicting motivations of work, vacations, recreation, and social activities override the educational motivation of all but a small minority of the students.

From the economic point of view the picture is not quite so bad. Most of the 66 students took more than one course; altogether there were 149 course registrations (Table 11), which at the rate of three credits per course, makes 447 "student-units" (defined as one student registered for one credit). According to the curve of estimated costs (page 35 above), the break-even point at University of Miami tuition rates (\$25 per credit) was c. 270 student units. The 66 students thus could have met the estimated costs of instruction with a comfortable margin.

It must be borne in mind, however, that in order to ensure securing a reasonably large sample no tuition at all was charged for the experiment. Doubtless fewer students would have registered had tuition been charged. This factor could be offset, perhaps, by enlarging the potential population by removing the artificial limitation imposed by the nature of the experiment, i.e., the confinement of registrations to recent high school graduates. The number of inquiries received from students already in college and from adults indicated a considerable enrollment potential among these groups.

It remains a matter of judgment, then, in terms of the purposes of the experiment, whether it is worthwhile to offer summer television courses for recent high school graduates if only a very small percentage of that specific potential population can actually be motivated to take the courses. It appears from the results of the experiment, however, that it is at least economically feasible with a student population as large as that of Southeast Florida.

Sample Characteristics

This experiment clearly established that the more highly motivated and better-qualified students are most likely to volunteer for summer television

courses. Hence the hypothesis that such courses could be used to make up some of the academic deficiencies of the less well-qualified students is negated. On the other hand, the hypothesis that such courses could be used by the better-qualified students to get a head-start in college work was supported by the results.

As to the third hypothesis, that the summer telecourses could serve a useful function in effecting a helpful bridging or transitional experience between high school and college, evidence from the depth interviews indicated that this function was not necessary for the brightest students in any event, but that it did operate for the less gifted students.

Effectiveness of Television Teaching

The testing program amply demonstrated the effectiveness of all three courses in achieving their educational objectives. The test results were supported by the subsequent academic history of the television students who took courses in residence at Miami, and by their own subjective evaluation of the experience.

Student Attitudes Toward Television Teaching

A highly favorable attitude toward television teaching was expressed by the television students, both immediately following the telecourses and a semester later, after they had had the experience of on-campus course work.

APPENDIX

PROJECT CONSULTANTS AND STAFF

University Administrative Authority	- C. Doren Tharp, Vice President and Dean of Faculties
Steering Committee	- K. Malcolm Beal, Chairman, English Dept.; John R. Beery, Dean of the School of Education and Director of Instruction; Vernon Bronson, Director, WTHS-TV; Clayton H. Charles, Prof. of Art; Prof. Georgia DelFranco, Asst. Prof. of Mathematics; Sydney W. Head, Director of Broadcasting and Film Services; W.W. Matthews, Asst. Superintendent for General Education, Dade County Schools; Ernest M. McCracken, Registrar; C. Lee Philips, Director, Testing Bureau; Jess Spierer, Coordinator, Guidance Center; J. Ben Stalvey, Prof. of Government; W.H. Steinbach, Director of Summer Sessions; Dan Steinhoff, Jr., Dean of Evening Div.; C. Doren Tharp, Vice President and Dean of Faculties; Carroll V. Truss, Asst. Prof. of Psychology; C. Raymond Van Dusen, Chairman, Board of Public Instruction of Dade County, Fla.; Paul Vonk, Asst. Dean of the College of Arts and Sciences.
Chief Investigator	- Sydney W. Head, Director of Broadcasting and Film Services
Tests and Measurements	- C. Lee Philips, Director, Testing Bureau
Statistical Consultant	- George J. Mouly, Professor of Education
Instructors	- Robert Hively, Asst. Prof., English Department; William B. Munson, Prof. of History; Edward W. Schuh, Assoc. Prof. of Philosophy
Producer-Directors	- Mort Berenstein. Ross Skipper
TV Crews	- Robert Blood, Richard Buckley, O. P. Kidder, Jr., Ronald Maloney, Jack Metzger, David G. Nellis, Whitman Ralsten, Jan Scarboro
Artists	- Ronald Maloney, Earl Roberts
Scene Technician	- William C. Beckwith
Statistical Clerks	- Jean C. Hosford. Frederick O. Leopold
Graders:	- Richard Allen, Arlene Cohen, John W. Fiero, Rosemary Furman, Estelle Jacobs, Peter Kaseleous, James Keech, Glorinda Konig, Peter G. Kousaleos, Joan Patti, Anna S. Munson, Phyllis M. Palmer, Richard Sternberg, James Vogel, Joseph F. Vogel Orville Wanzer
Administrative Assistants	- Mary Graham Crow, Harvey Price
Secretary	- Mariel Hathorn